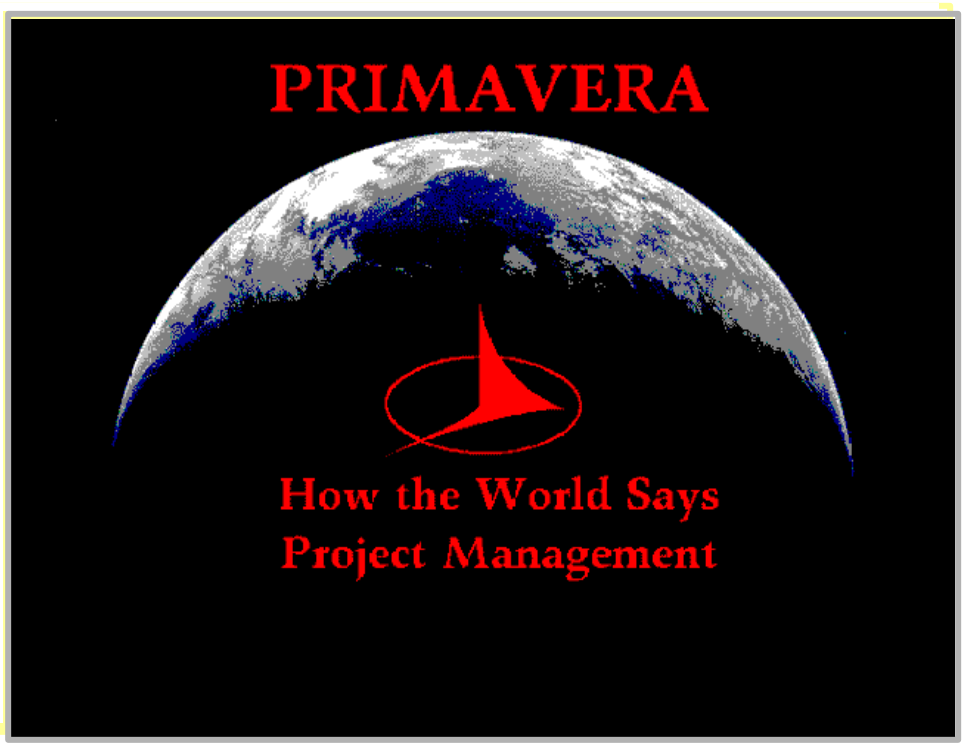
The Earned Value Body of Knowledge (EV-BOK)



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Project Management Institute (PMI)

"The Project Management Body of Knowledge (PMBOK)…describes the sum of knowledge within the profession of project management."

PMBOK Guide 1996

Agenda:
The Earned Value Body of Knowledge

- **Evolution into a Management Science**
- **The Earned Value Body of Knowledge**
- **Our opportunity to Leave a Legacy**

A “Management Science”

“The utilization of scientific methodology

or principles

in solving management problems.”

Dr. David Cleland & Dr. Harold Kerzner
A Project Management Dictionary of Terms

Remember the Scientific Method:

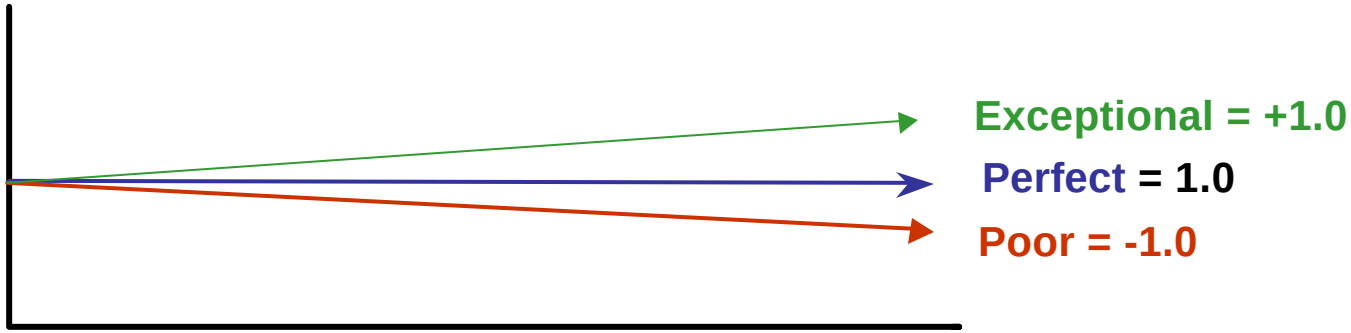
1. Formulate a testable hypothesis
2. Design an experiment to test
3. Conduct controlled experiments
4. Compare results with predictions
5. Develop theories from the results
6. Document & continue the evolution

Early Management Scientists:

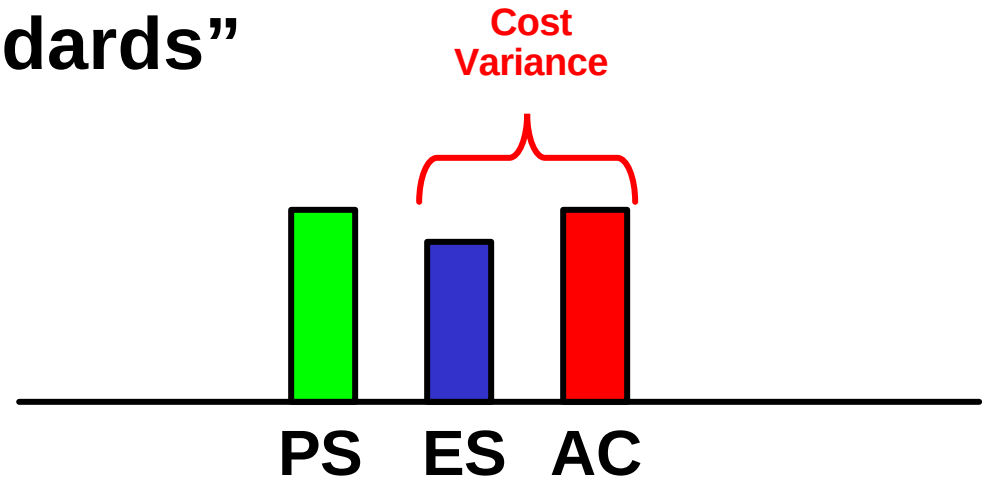
- **Frederick W. Taylor**
- **Frank & Lillian Gilbreth**
- **Henry Laurence Gantt**
- **Henri Fayol**
- **and others...**

Circa 1890s...
...in the Industrial Factories

1. “Management by Exception”…to a baseline



2. “Factory Standards”



Neo Management Scientists:

- **Robert Kemps (DOD; DOE)**
- **Gary Christle (DOD)**
- **Wayne Abba (DOD)**
- **Dr. David Christensen (AFIT)**
- **and many others...**

Circa 1974
the Bob Kemps' road shows

The DOD's

new C/SCSC

CPR & C/SSR

& the Baseline

Circa 1991
the Christle & Abba road shows

Postmortem

on the

The Navy A-12

Cancellation

Circa 1993 through 1997
Dr. Christensen's published studies:

The CPI Stability	***EAC Performance Indices***	***A Review of EAC Research***

NCMA, PMA, PMI, SCEA Magazines...

Earned Value Applications... happen all the time

- **Architectural Design work**
- **Construction**
- **Ship Building**
- **Lender agreements**
- **Performance Based Payments**

The times...They have Changed

---the climate is right---

Circa 1987

USG: ***Here are 174 criteria, take it…***

Industry: ***Can't we talk about it!***

Circa 1997

USG: ***Let's work together...***

Industry: ***What did they say?***

Documenting an Earned Value Body of Knowledge

Chapter 3
Fleming & Koppelman
PMI October 1996

#1

Empirical documentation

of actual performance results

from over 700 projects

Contracts at 15% complete point

(Gary Christle)

- **GIVEN:**
  1. ***Overrun at completion will not be less than overrun to date.***
  2. ***Percent overrun at completion will be greater than percent overrun to date.***
- **CONCLUSION:** ***You can't recover!!***
- **WHO SAYS:** ***More than ~~300~~ 700 major DOD contracts since 1977.***
- **WHY:** ***If you underestimated the near, there is no hope that you did better on the far term planning.***

#2

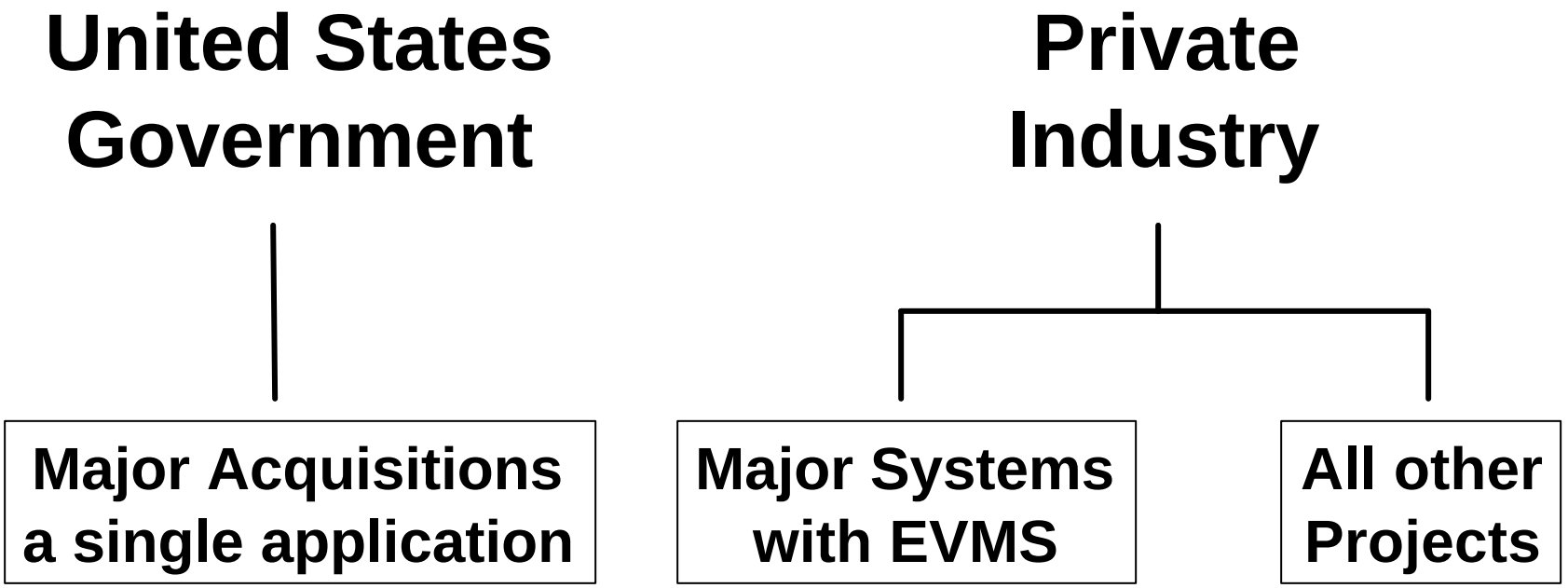
A single

management control system

providing enterprise-wide data on

all projects & all production work

Government is ahead of private industry



---Industry still has opportunities---

#3

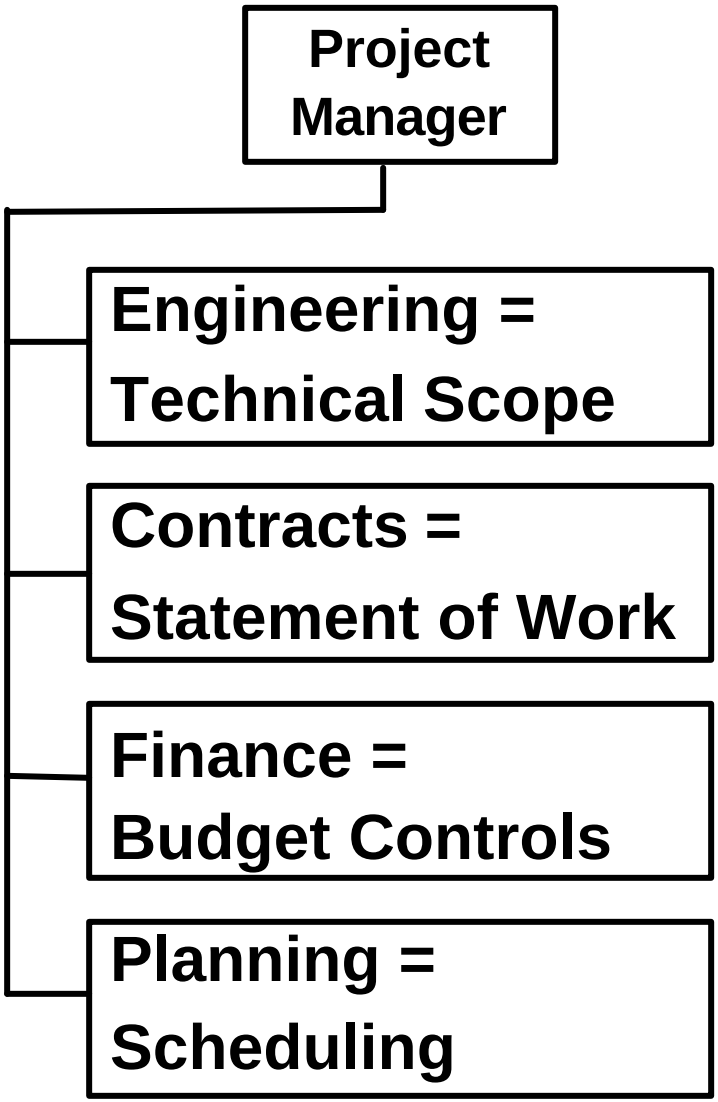
An "integrated"

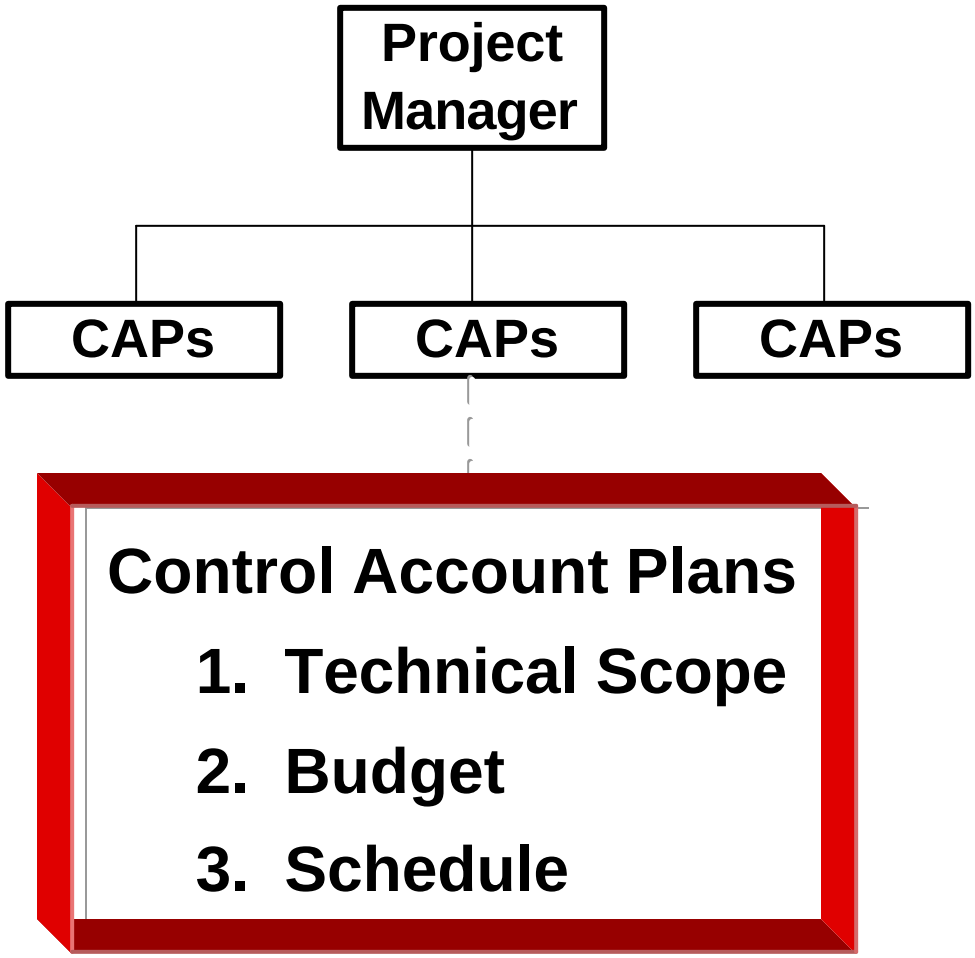
management control system

combining the project's

***technical* + time + resources**

Which management approach is most effective?





#4

The use of

Management by Exception (MBE)

to monitor performance

against baselines

#5

The utility of the

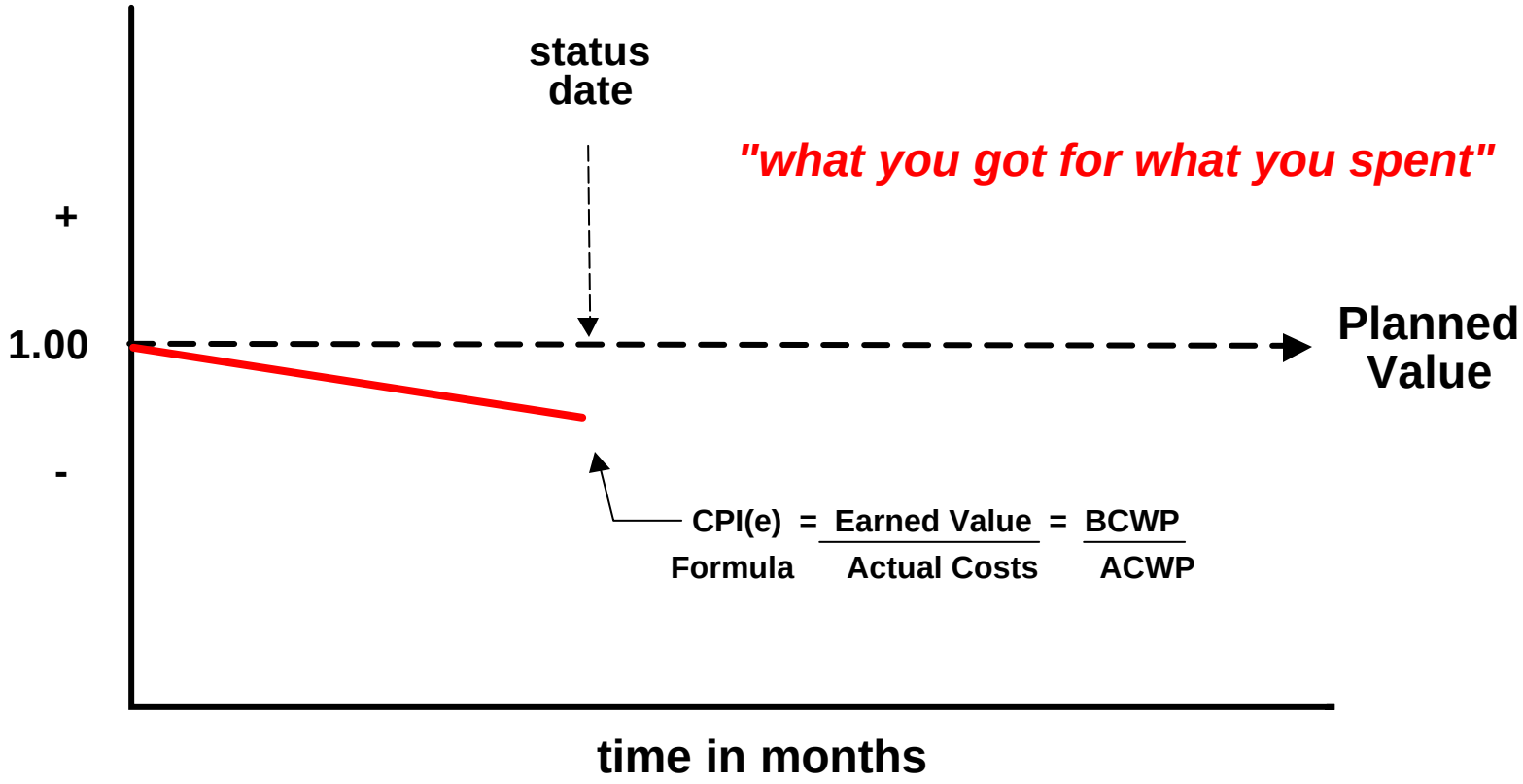
Cost Performance Index(e) to report

the true cost "efficiency"

on all projects

Monitoring project performance:

focus on cum CPI(efficiency)



Stability of the Cumulative CPI

(Dr. David Christensen-study of 155 contracts 1971 to 1991)

- **Cumulative CPI stabilizes at 20% point**
- **At 20%point variances only +/- 10%**
- **Variances get tighter to the end**

---with the CPI one can forecast the end---

#6

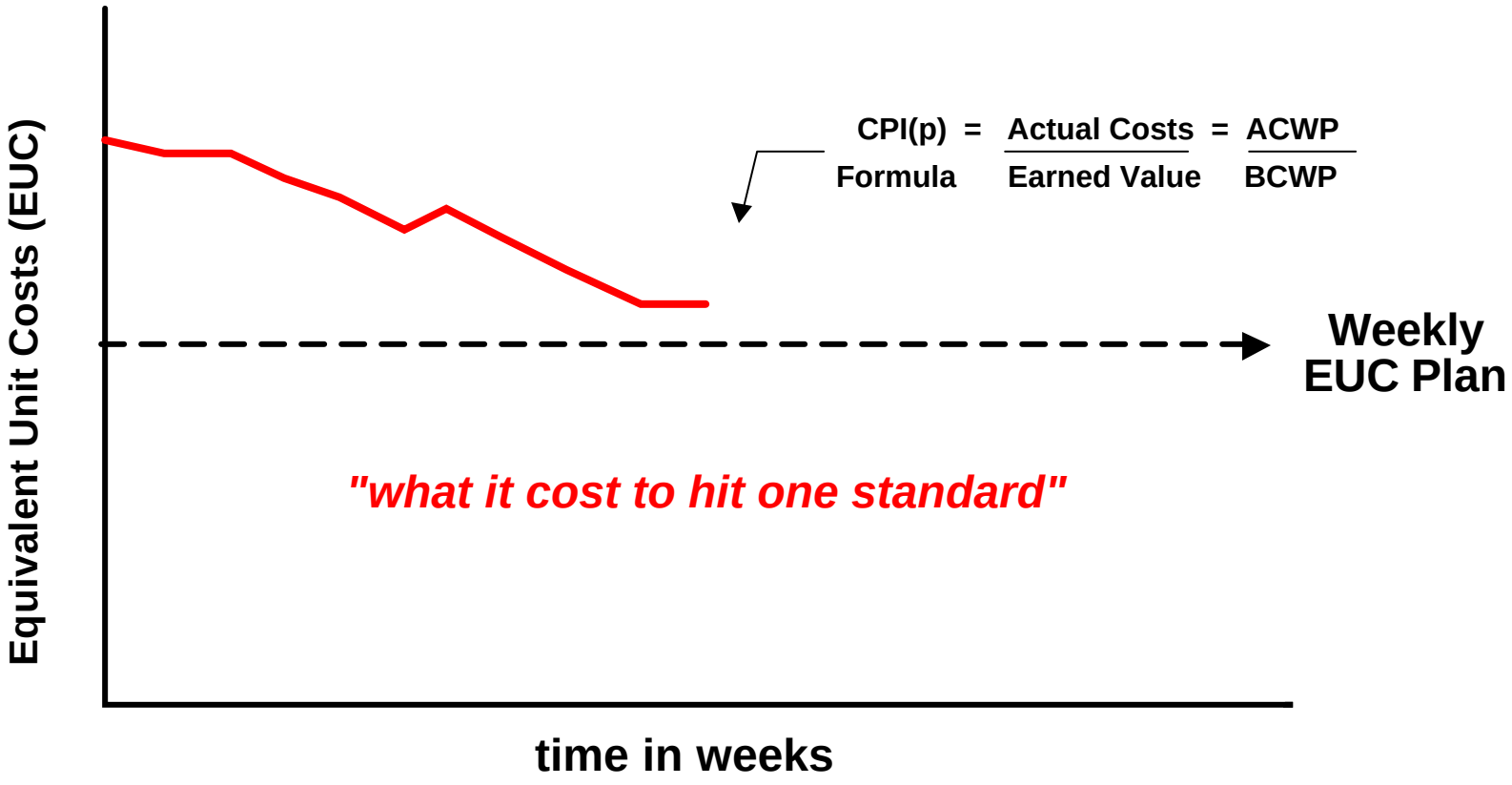
The utility of a period

Cost Performance Index(p) to monitor

a production standard

Monitoring production effort:

focus on the weekly CPI (performance)



#7

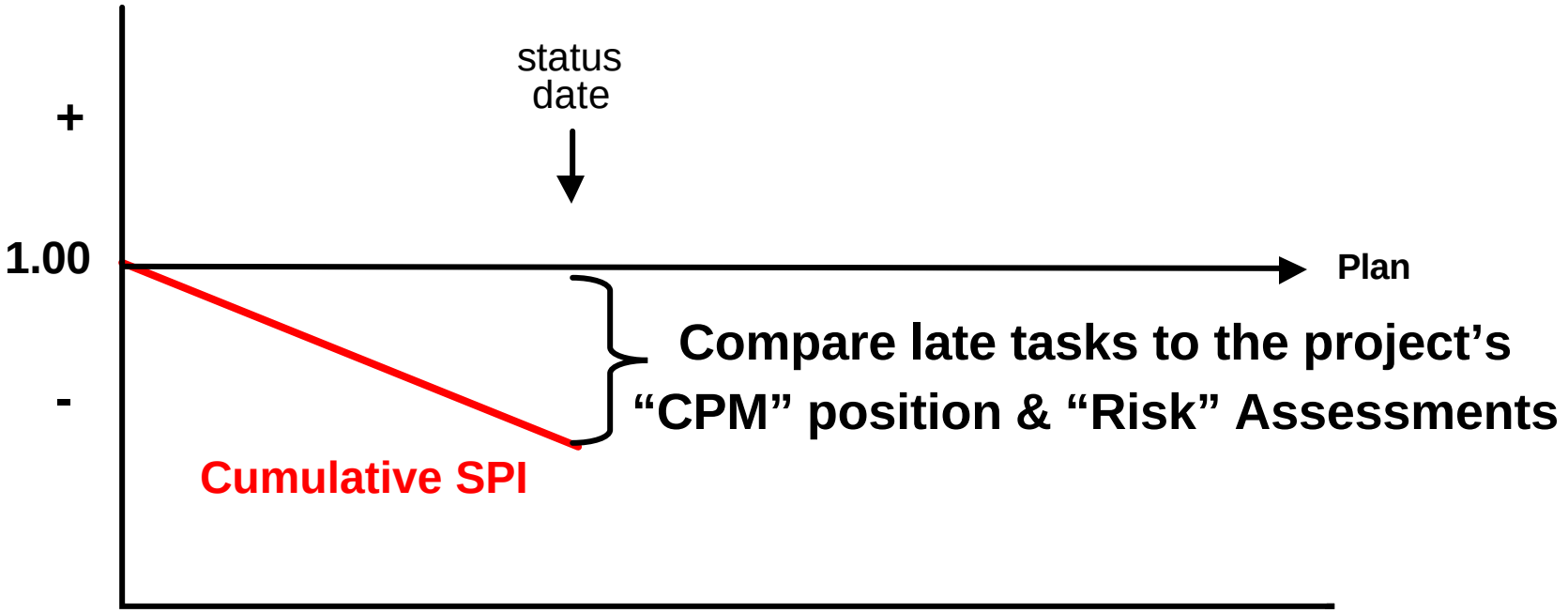
The utility of the

Schedule Performance Index (SPI)

to isolate & quantify the value of work

scheduled...but not performed

Comparison of the earned value schedule position with the critical path…prevents the wastage of project resources



#8

The utility of the

Cumulative CPI$_{(e)}$ to

statistically forecast a "low-end"

Estimate at Completion

The Cumulative CPI as a Forecaster

(Dr. David Christensen-study of 155 contracts 1971 to 1991)

- **Non-cumulative CPI lacks predictive value**
- **Weighted 20/80 formula lacks predictive value**
- **Short period averages have predictive value**
- **Longer period averages do not**

#9

The utility of the

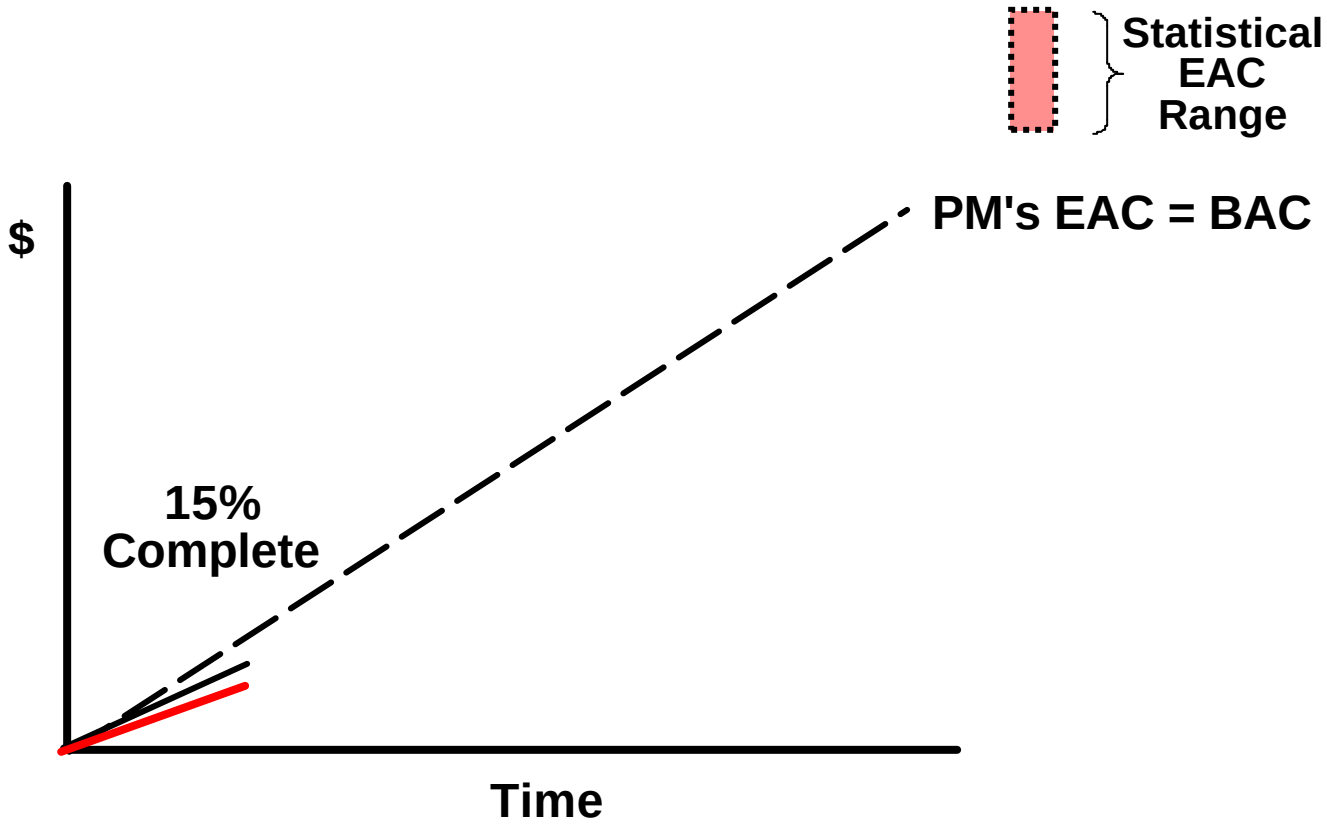
Cumulative CPI$_{(e)}$ times the SPI

to statistically forecast a "high-end"

Estimate at Completion

Cost Risks Can Be Managed

(with an “early warning” signal)



#10

The utility of

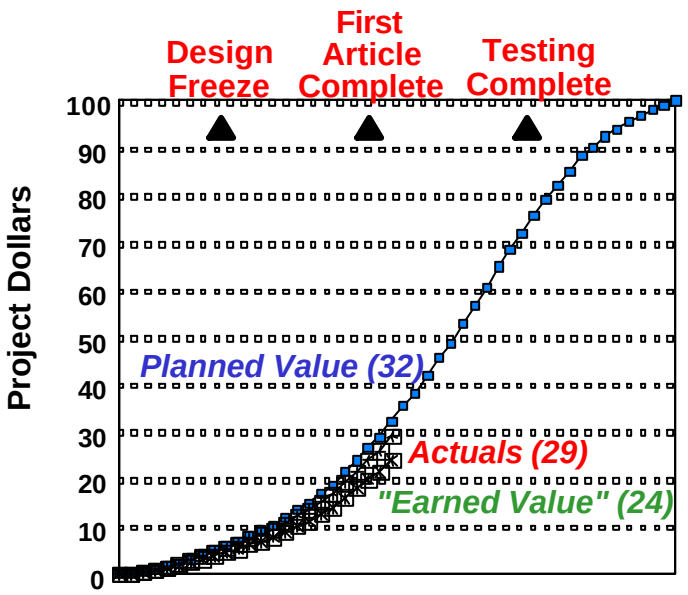
Earned Value Management

to monitor the remaining effort

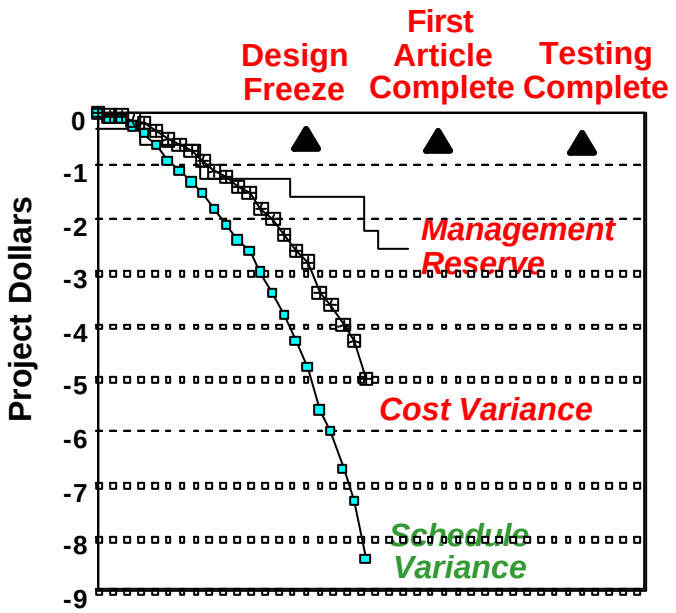
within management's expectations

Side-by-Side Displays

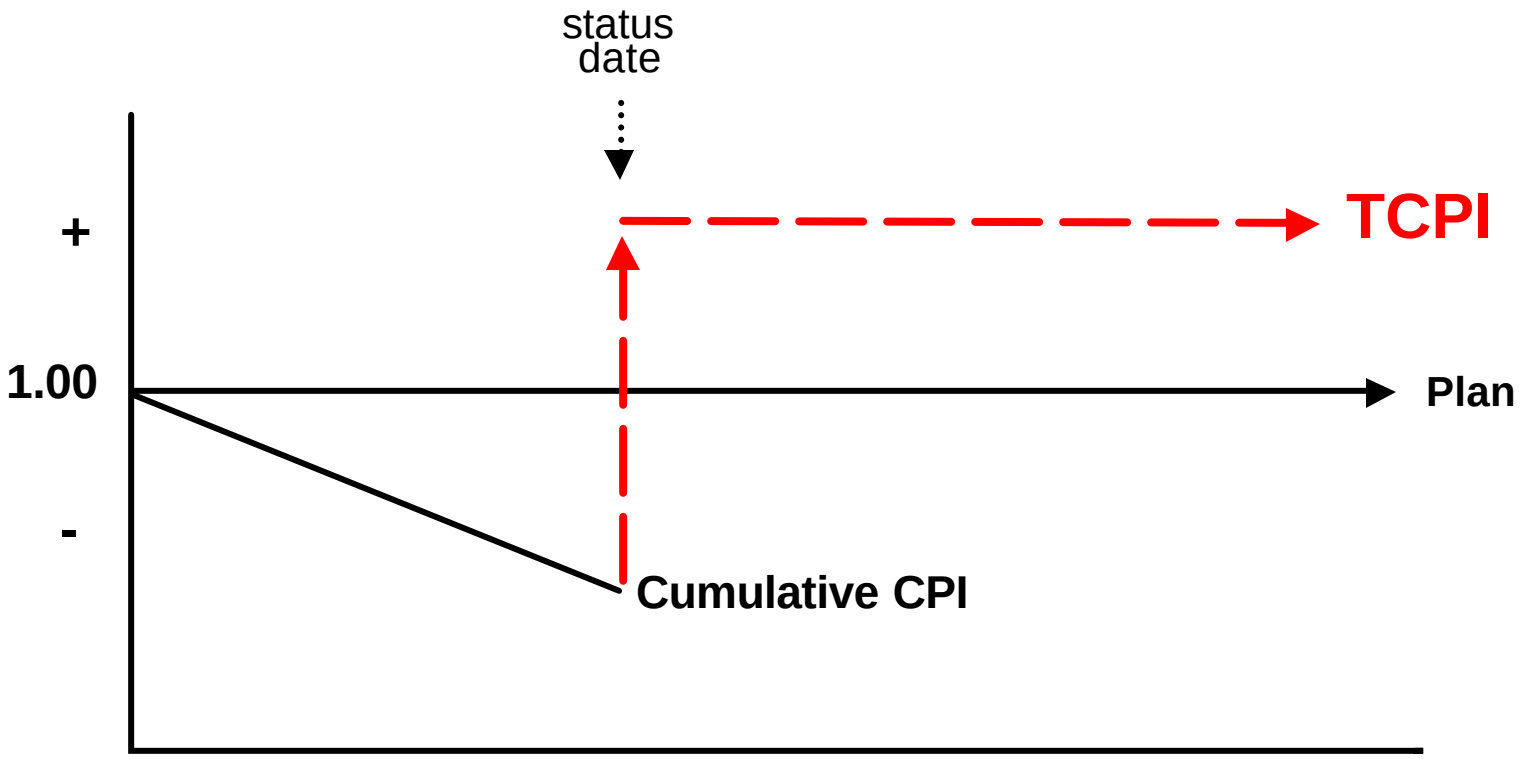
Cumulative Performance Curves



Cumulative Variance Trends



"To Complete (the work) Performance Index" (TCPI)
to focus on goals set by management: BAC / EAC / Ceiling



Formula:

$$\frac{\text{Work Remaining}}{\text{Funds Remaining}} = \text{TCPI}$$

In Summary

- **EV has become a Management Science**
- **We should welcome this direction**
- **It is now time to formalize the:**

"Earned Value Body of Knowledge"